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## ABSTRACT

This study investigated differences in two-year and four-year college students' learning styles in general education as compared to allied health education. It noted whether being a general education student or an allied health education student contributed to each student's learning style and whether being a traditional or nontraditional student in a two-year or four-year college would contribute to learning style. Participating students from two-year and four-year colleges in West Virginia and Alabama completed the Group Assessment of Logical Thinking (GALT), which identifies learning style as concrete, transitional, or formal. General education students in the two-year college tested in the expected range. A large percentage of them, regardless of whether they were traditional or nontraditional, were concrete learners. Two-year students in the allied health fields fit into the expected ranges, as 46.14 percent were concrete learners. Among the four-year general education students, 11.54 percent were concrete learners, 34.61 percent were transitional learners, and 53.85 percent were formal learners. These numbers did not fit the expected percentages of approximately 50 percent concrete learners. When comparing traditional and nontraditional students in two-year and four-year colleges, researchers noted that there were many more nontraditional students in the two-year college than the four-year college. (Contains 13 tables.) (SM)

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COMPARING TWO YEAR AND FOUR YEAR COLLEGE STUDENTS'  
LEARNING STYLES  
IN  
GENERAL EDUCATION AND ALLIED HEALTH EDUCATION

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COMPARING TWO AND FOUR YEAR COLLEGE STUDENTS'  
LEARNING STYLES  
IN  
GENERAL AND ALLIED HEALTH EDUCATION

Introduction

In both two year community colleges and four year colleges students attend who can be classified by ages as traditional (those students who are less than twenty-five years old) or nontraditional (those students who are twenty-five years old or older.) Both of these groups vary in their backgrounds, educational abilities and expertise, and learning styles, factors which influence the students' success in the college setting as noted by Witkinha and Goodenough (1981) and Kagan (1988.) In order assist the instructor in selecting the most appropriate presentation method for the students in a particular class, it is very helpful to assess the students' learning style. To determine and meet the students instructional needs in appropriate ways based on their learning style Stewart (1990) states that the teacher must , "First diagnose students' learning styles, ... adapt appropriate teaching-learning components to the students' strengths and preferences;... evaluate student progress... make necessary changes" (p. 372.)

There are a variety of learning styles instruments available which the instructor can use to identify the students' learning styles and with the knowledge gained organize classroom presentations and laboratory experiences to allow for students' successful learning experiences. One such instrument, the Group Assessment of Logical Thinking (GALT) developed by Roadrangka, et.al. (1983), follows Piaget's theory of cognitive thinking. The GALT identifies the student's learning style as either concrete, transitional, or formal.

Some of the characteristics of the GALT include the following:

1. The test measures six logical operations:  
conservation, proportional reasoning,  
controlling variables, combinational  
reasoning, probabilistic reasoning, and  
correlational reasoning;
2. The test uses a multiple-choice format  
for presenting options for answers, as  
well as, the justification reason for that answer;
3. Pictorial representations of real objects  
are employed in all test items;
4. The test is suitable for students reading  
at the sixth grade level or higher;

5. The test has sufficient reliability and validity to distinguish between groups of students at concrete, transitional, and formal stages of development; and,
6. The test can be administered in one class period to a large group by individuals who serve simply as proctors (Roadranga, et.al., 1983.)

Roadranga, et.al. (1983) noted that as students advance in age and grades there was a general increase in cognitive ability but that "the majority of middle school students exhibit conservation skills and high school students have gained in these skills but show the same pattern of weaknesses. The majority of college students exhibit probabilistic reasoning skills" (p.9.) More than fifty percent of students interviewed and tested with the GALT were concrete learners. The following suggestions were presented which would help teachers in presenting materials to the concrete learners:

#### I. Organizing Information

- A. Note-Taking
- B. Obtaining material from texts
  1. Overview
  2. Identification of information/ideas
    - a. sequencing of events
    - b. causal relationships
    - c. listing without order
    - d. comparing information
    - e. defining terms

#### II. Assimilating Information

- A. Computer Assisted Instruction
  1. Tutorials
  2. Simulations
  3. Reviews, Sample Tests, Study Guides
  4. Word processing
  5. Collecting and analyzing data
- B. Cooperative Learning (Peer Modeling)
  1. Peer Matching by Level of Reasoning Ability
  2. Time on Task
  3. Thinking Out Loud
- C. Concept Mapping
  1. Individual
  2. Small Groups

#### D. Problem Solving and Comprehension

1. Problem Integration
2. Problem Integration
3. Solution Planning and Monitoring
4. Solution Execution (Roadranga, et.al., 1983.)

#### The Study

During the Spring Quarter 1998 and Fall semester 1998 at Wallace State Community College, a two year college in Dothan, Alabama and at West Liberty State College, a four year college in West Liberty, West Virginia the Group Assessment of Logical Thinking (GALT) developed by Roadranga, et.al. (1983) was administered to student volunteers in the areas of general education and allied health education. The inventory identifies the individual as a concrete, transitional, or concrete learner. The student volunteers at the two year college were in general biology and advanced biology classes. Students in a variety of fields register for general biology while those in allied health fields register for the advanced biology only after completing the general biology class or passing a challenge examination. The general education students at the four year college were in educational psychology and models of education classes and the allied health education students were in the nursing program. The investigation was designed to answer questions regarding differences in students' learning styles as identified by the GALT when both traditional (under twenty-five years old) and nontraditional (twenty-five years old or older) students are pursuing two different educational fields.

The questions are as follows:

1. Is there a difference in two year college students' learning styles in general education as compared to two year college students' learning styles in allied health education?
2. Is there a difference in four year college students' learning styles in general education as compared to four year college students' learning styles in allied health education?
3. Did being a general education student in a two year college or a four year college contribute to each student's learning style as measured by the GALT?
4. Did being an allied health education student in a two year or a four year college contribute to each student's learning style as measured by the GALT?
5. Did being a traditional student in a two year or a four year college contribute to each students' learning style as measured by the GALT?
6. Did being a nontraditional student in a two year or a four year college contribute to each students' learning style as measured by the GALT?

## RESULTS

The two year college participants were in general biology (general education) and advanced biology (allied health education) classes. There were 171 volunteers who completed the GALT in the two year college. The results of the GALT were 75 (43.86%) concrete learners, 57 (33.33%) transitional learners, and 39 (22.81%) formal learners. Of these 171 participants, 94 (55%) were in general education and 77 (45%) were in allied health education. Within the general education group 67 (71.3%) were traditional students and 27 (28.7%) were nontraditional students. Within the allied health education group 43 (55.8%) were traditional students and 34 (44.2%) were nontraditional students. Of the participants in the two year college allied health programs, 30 (38.96%) students were concrete learners, 27 (35.06%) were transitional learners, and 20 (25.97%) were formal learners (Tables Two and Three.)

There were 52 general education student volunteers in the four year college phase of the study. Of these, 45 (86.54%) were traditional students and 7 (13.46%) were nontraditional students. Of the 45 traditional students, 5 (11.11%) were concrete learners, 17 (37.77%) were transitional learners, and 23 (51.11%) were formal learners (Table Four.) Of the 7 nontraditional student volunteers, 1 (14.29%) was a concrete learner, 1 (14.29%) was a transitional learner, and 5 (71.42%) were formal learners (Tables Five and Six.) Results of the four year college allied health program students will be presented later.

## DISCUSSION

The general education students in the two year college tested in the expected ranges since a large percentage of the students regardless of whether they were traditional or nontraditional tested as concrete learners. According to the authors of the Group Assessment of Learning Techniques (GALT) (Roadrangka, et. al., 1983) allied health students are typically concrete learners who learn best using science models and other hands-on activities. Those two year community college students in the allied health fields fit into the expected ranges as 46.14% (42 of the 91 subjects) tested as concrete learners. Information regarding the four year college allied health students is not available at this time.

Results of the four year general education college students indicated that 6 (11.54%) were concrete learners, 18 (34.61%) were transitional learners and 28 (53.85%) were formal learners. These numbers did not fit the expected percentages of approximately 50% concrete learners. Perhaps these students had more experiences in testing and had developed more analytical skills since they were in educational psychology and methods of teaching classes. Studies by Ehle and Larimer (1998) indicated that a high percentage of preservice teachers were concrete sequential learners (similar to concrete) using a different learning instrument.

When comparing the traditional and nontraditional students in two year and four year colleges it was noted that there were many more nontraditional, students twenty five years old and older, in the two year college than the four year college. Considering the mission of the two year college and the economic changes within the two year college service area this would be considered normal.

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TABLE ONE  
TWO YEAR STUDENTS' LEARNING STYLES  
(GALT)

TWO YEAR STUDENTS N=171	CONCRETE 75 43.86%	TRANSITIONAL 57 33.33%	FORMAL 39 22.81%
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TABLE TWO  
TWO YEAR COLLEGE TRADITIONAL STUDENTS  
(UNDER 25 YEARS OLD)

GENERAL EDUCATION N=67	CONCRETE 28 41.79%	TRANSITIONAL 24 35.82%	FORMAL 15 22.39%
ALLIED HEALTH EDUCATION N=43	11 25.58%	14 32.56%	18 41.86%

TABLE THREE  
NONTRADITIONAL TWOYEAR COLLEGE STUDENTS  
(25 YEARS OLD AND OLDER)

GENERAL EDUCATION N=27	CONCRETE 17 62.96%	TRANSITIONAL 6 22.22%	FORMAL 4 14.81%
ALLIED HEALTH EDUCATION N=34	19 55.88%	13 38.24%	2 5.88%



TABLE FOUR  
FOUR YEAR STUDENTS' LEARNING STYLES  
(GALT)

FOUR YEAR COLLEGE STUDENTS N=	CONCRETE	TRANSITIONAL	FORMAL
	14 17.07%	24 29.27%	44 53.66%
TRADITIONAL N=67	10 14.93%	22 32.83%	35 52.24%
NONTRADITIONAL N=15	4 26.67%	2 13.33%	9 60%

TABLE FIVE  
FOUR YEAR COLLEGE TRADITIONAL STUDENTS  
(UNDER 25 YEARS OLD)

GENERAL EDUCATION STUDENTS N=45	CONCRETE	TRANSITIONAL	FORMAL
	5 11.11%	17 37.77%	23 51.11%
ALLIED HEALTH EDUCATION N=22	5 22.73%	5 22.73%	12 54.54%

TABLE SIX  
FOUR YEAR COLLEGE NONTRADITIONAL STUDENTS  
(25 YEARS OLD OR OLDER)

GENERAL EDUCATION N=7	CONCRETE	TRANSITIONAL	FORMAL
	1 14.29%	1 14.29%	5 71.42%
ALLIED HEALTH EDUCATION N=8	3 37.50%	1 12.50%	4 50%

TABLE ELEVEN  
COMPARISON OF TWO AND FOUR YEAR  
NONTRADITIONAL COLLEGE STUDENTS'  
LEARNING STYLES

TWO YEAR COLLEGE STUDENTS N=27	CONCRETE  17 62.96%	TRANSITIONAL  6 22.22%	FORMAL  4 14.81%
FOUR YEAR COLLEGE STUDENTS N=7	1 14.29%	1 14.29%	5 71.42%

TABLE TWELVE  
COMPARISON OF TWO YEAR AND FOUR YEAR  
TRADITIONAL COLLEGE STUDENTS'  
LEARNING STYLES  
IN  
ALLIED HEALTH

TWO YEAR COLLEGE STUDENTS N=43	CONCRETE  11 25.58%	TRANSITIONAL  14 32.56%	FORMAL  18 41.86%
FOUR YEAR COLLEGE STUDENTS N=22	5 22.73%	5 22.73%	12 54.54%

TABLE THIRTEEN  
COMPARISON OF TWO YEAR AND FOUR YEAR  
NONTRADITIONAL COLLEGE STUDENTS'  
LEARNING STYLES  
IN  
ALLIED HEALTH

TWO YEAR COLLEGE STUDENTS N=34	CONCRETE  19 55.88%	TRANSITIONAL  13 38.24%	FORMAL  2 5.88%
FOUR YEAR COLLEGE STUDENTS N=8	3 37.50%	1 12.50%	4 50%



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